

PH-2665PCT (Article 19 Amendment)

Claims according to the Amendment [accepted by the International Bureau on November 26, 2004: claims 6-20 as originally filed are amended; claim 1 as originally filed is withdrawn; new claims 21-23 are added; other claims remain unchanged. (7 pages)]

1. (Deleted)

2. A device for judging the type of liquid inside a container, comprising:

a plate capacitor comprising two plate electrodes disposed opposite to each other;

a container supporting means for holding, in a region other than the region sandwiched by said two plate electrodes, a non-conductive container that can contain a liquid; and

a third electrode, besides said two plate electrodes, that is an electrode outside said container and that is disposed along a portion of said container at which said liquid inside said container is retained due to gravity,

wherein the type of liquid inside the container is judged by detecting the capacitance of said capacitor or the oscillation frequency of an oscillation circuit containing said capacitor.

3. The device for judging the type of liquid inside a container according to claim 2, wherein said third electrode is a plate electrode or a line electrode that is disposed along a surface that is a flat surface perpendicular to said plate capacitor and that is in contact with an outer side of said container.

4. The device for judging the type of liquid inside a container according to claim 3, wherein said third electrode is moved to an outer surface of said container upon detection of said container being disposed on said container supporting means or in linkage with said container being disposed on said container supporting means.

5. The device for judging the type of liquid inside a container according to any one of claims 2 to 4, having either:

a first arrangement wherein the voltage of said third electrode differs in absolute value and/or phase from the voltage of a first plate electrode of said capacitor that is disposed on the container side; or

a second arrangement wherein the voltage of said third electrode is equal to the voltage of a second plate electrode of said capacitor that is opposite said first plate electrode.

6. (Amended) The device for judging the type of liquid inside a container according to any one of claims 2 to 5, wherein said container supporting means adjusts, in accordance with the size of said container, the distance between a first plate electrode of said two plate electrodes that is disposed on the side of said container and said container.

7. (Amended) A device for judging the type of liquid inside a container, comprising:

a plate capacitor comprising two plate electrodes disposed opposite to each other; and

a container supporting means for holding, in a region other than the region sandwiched by said two plate electrodes, a non-conductive container that can contain a liquid,

wherein the type of liquid inside the container is judged by detecting the

capacitance of said capacitor or the oscillation frequency of an oscillation circuit containing said capacitor,

and wherein said container supporting means adjusts, in accordance with the size of said container, the distance between a first plate electrode of said two plate electrodes that is disposed on the side of said container, and said container.

8. (Amended) The device for judging the type of liquid inside a container according to claim 6 or 7, wherein said container has a cylindrical or prismatic outer shape and is supported on said container supporting means, with the columnar direction of said cylindrical or prismatic shape being set parallel to said first plate electrode, and

said container supporting means comprises two stairs-like members that increase in height in a direction perpendicular to said first plate electrode and that are disposed opposite each other, wherein the distance between said container and said first plate electrode is adjusted according to the size of said container when an outer peripheral surface of said prismatic or cylindrical container abuts against the steps or ridge parts of the steps of said two stairs-like members.

9. (Amended) The device for judging the type of liquid inside a container according to claim 8, wherein a step member is disposed on one side of said steps that extend in said columnar direction, and

an average distance to said first plate electrode increases when one end of a container larger than said container, whose outer peripheral surface abuts against the steps of said two stairs-like members, is raised by said step member.

10. (Amended) The device for judging the type of liquid inside a container according to claim 6 or 7, wherein said container has a cylindrical, prismatic, or spherical outer shape and is supported on said container supporting means, with the columnar direction of

said cylindrical or prismatic shape being set perpendicular to said first plate electrode, and

said container supporting means is structured such that it is surrounded by stairs-like members that increase in height in a direction perpendicular to said first plate electrode, wherein the distance between said container and said first plate electrode is adjusted according to the size of said container when the bottom surface of said prismatic or cylindrical container abuts against the steps of the stairs-like members and when the outer peripheral surface of said spherical container abuts against the ridge parts of said steps.

11. (Amended) The device for judging the type of liquid inside a container according to claim 6 or 7, wherein said container has a cylindrical or prismatic outer shape and is supported on said container supporting means, with the columnar direction of said cylindrical or prismatic shape being set parallel to said first plate electrode, and

said container supporting means has a groove with V-cross section having an opening in a direction perpendicular to said first plate electrode, wherein the distance between said container and said first plate electrode is adjusted according to the size of said container when an outer peripheral surface of said prismatic or cylindrical container abuts against the V-grooved surface.

12. (Amended) The device for judging the type of liquid inside a container according to claim 6 or 7,

wherein said container has a cylindrical, prismatic, or spherical outer shape and is supported on said container supporting means, with the columnar direction of said cylindrical or prismatic shape being set perpendicular to said first plate electrode, and

said container supporting means has a conical opening in a direction perpendicular to said first plate electrode, wherein the distance between said container

and said first plate electrode is adjusted according to the size of said container when a ridge portion of the bottom surface of said prismatic or cylindrical container, or the outer peripheral surface of said spherical shape container, abuts against the wall surfaces of said conical opening.

13. (Amended) The device for judging the type of liquid inside a container according to any one of claims 2 to 5, wherein said container supporting means adjusts, in accordance with the size of said container, the area of overlap between said container and said plate electrodes as projected in the normal direction perpendicular to a first plate electrode of said two plate electrodes that is disposed on the side of said container.

14. (Amended) A device for judging the type of liquid inside a container, comprising:

- a plate capacitor comprising two plate electrodes disposed opposite to each other; and

- a container supporting means for holding, in a region other than the region sandwiched by said two plate electrodes, a non-conductive container that can contain a liquid,

- wherein the type of liquid inside the container is judged by detecting the capacitance of said capacitor or the oscillation frequency of an oscillation circuit containing said capacitor, and

- wherein said container supporting means adjusts, in accordance with the size of said container, the area of overlap between said container and said plate electrodes as projected in the normal direction perpendicular to a first plate electrode of said two plate electrodes that is disposed on the side of said container.

15. (Amended) The device for judging the type of liquid inside a container according to claim 13 or 14, wherein said container has a cylindrical, prismatic, or spherical outer

shape and is supported on said container supporting means, with the columnar direction of said cylindrical or prismatic shape being set parallel to said first plate electrode, and

said container supporting means has an inclined surface of an acute angle with respect to said first plate electrode, wherein said area of overlap between said container and said plate electrodes is adjusted according to the size of said container when a ridge portion of the bottom surface of said prismatic or cylindrical container, or the outer peripheral surface of said spherical container, abuts against said inclined surface.

16. (Amended) The device for judging the type of liquid inside a container according to claim 13 or 14, wherein said container has a cylindrical, prismatic, or spherical outer shape and is supported on said container supporting means, with the columnar direction of said cylindrical or prismatic shape being set parallel to said first plate electrode, and

said container supporting means has a stairs-like member that increases in height in a direction parallel to said first plate electrode, wherein said area of overlap between said container and said plate electrodes is adjusted according to the size of said container when the bottom surface of said prismatic or cylindrical container abuts against a step of said stairs-like member, and when the outer peripheral surface of said spherical container abuts against a ridge portion of said step.

17. (Amended) The device for judging the type of liquid inside a container according to any one of claims 6 to 9, 11, and 13 to 16, wherein said container supporting means is inclined at a predetermined angle with respect to a level surface while the relative positions of said container supporting means and said two plate electrodes are maintained.

18. (Amended) The device for judging the type of liquid inside a container according to any one of claims 2 to 15, further comprising:

a sensor for detecting whether or not said container is disposed on said container supporting means;

means for detecting the amount of change between the capacitance of said capacitor or the oscillation frequency of said oscillation circuit when said container is not disposed on said container supporting means and the capacitance of said capacitor or the oscillation frequency of said oscillation circuit when said container is disposed on said container supporting means; and

a notification means for giving notification as to whether or not said change amount is greater than a predetermined threshold value.

19. (Amended) A device for judging the type of liquid inside a container, comprising:

a plate capacitor comprising two plate electrodes disposed opposite to each other;

a container supporting means for holding, in a region other than the region sandwiched by said two plate electrodes, a non-conductive container that can contain a liquid;

a sensor for detecting whether or not said container is disposed on said container supporting means;

means for detecting the amount of change between the capacitance of said capacitor or the oscillation frequency of said oscillation circuit when said container is not disposed on said container supporting means and the capacitance of said capacitor or the oscillation frequency of said oscillation circuit when said container is disposed on said container supporting means; and

a notification means for giving notification as to whether or not said change amount is greater than a predetermined threshold value,

wherein the type of liquid inside the container is judged by detecting the capacitance of said capacitor or the oscillation frequency of an oscillation circuit

containing said capacitor.

20. (Amended) The device for judging the type of liquid inside a container according to claim 18 or 19, further comprising:

a storage means for recording the capacitance of said capacitor or the oscillation frequency of said oscillation circuit when said container is not disposed on said container supporting means; and

means for periodically updating said capacitance or oscillation frequency recorded in said storage means.

21. (Added) A method for controlling a device for judging the type of liquid inside a container, said device comprising:

a plate capacitor comprising two plate electrodes disposed opposite to each other;

a container supporting means for holding, in a region other than the region sandwiched by said two plate electrodes, a non-conductive container that can contain a liquid;

means for detecting the capacitance of said capacitor or the oscillation frequency of an oscillation circuit containing said capacitor; and

a sensor for detecting whether or not said container is disposed on said container supporting means, said method comprising:

a first detection step of detecting that said container is not disposed on said container supporting means;

a first measurement step of measuring the capacitance of said capacitor or the oscillation frequency of said oscillation circuit upon detection in said first detection step;

a second detection step of detecting that said container is disposed on said



container supporting means;

a second measurement step of measuring the capacitance of said capacitor or the oscillation frequency of said oscillation circuit upon detection in said second detection step; and

a step of giving notification as to whether or not the difference between the capacitance or oscillation frequency measured in said first measurement step and the capacitance or oscillation frequency measured in said second measurement step is greater than a predetermined threshold value.

22. (Added) A method for controlling a device for judging the type of liquid inside a container, said device comprising:

a plate capacitor comprising two plate electrodes disposed opposite to each other;

a container supporting means for holding, in a region other than the region sandwiched by said two plate electrodes, a non-conductive container that can contain a liquid;

a third electrode other than said two plate electrodes, of which said capacitor is comprised, wherein said third electrode is an electrode outside said container and that is disposed along a portion of said container at which said liquid inside said container is retained due to gravity;

means for detecting the capacitance of said capacitor or the oscillation frequency of an oscillation circuit containing said capacitor; and

a sensor for detecting whether or not said container is disposed on said container supporting means,

wherein said device has either a first arrangement wherein the voltage of said third electrode differs in absolute value and/or phase from the voltage of a first plate electrode of said capacitor that is disposed on the side of said container, or a second

arrangement wherein the voltage of said third electrode is equal to the voltage of the second plate electrode of said capacitor that is opposite said first plate electrode, said method comprising:

- a first detection step of detecting that said container is not disposed on said container supporting means;

- a first measurement step of measuring the capacitance of said capacitor or the oscillation frequency of said oscillation circuit upon detection in said first detection step;

- a second detection step of detecting that said container is disposed on said container supporting means;

- a second measurement step of measuring the capacitance of said capacitor or the oscillation frequency of said oscillation circuit upon detection in said second detection step; and

- a step of giving notification as to whether or not the difference between the capacitance or oscillation frequency measured in said first measurement step and the capacitance or oscillation frequency measured in said second measurement step is greater than a predetermined threshold value.

23. (Added) The method for controlling a device for judging the type of liquid inside a container according to claim 21 or 22, further comprising:

- a third measurement step of measuring the capacitance of said capacitor or the oscillation frequency of said oscillation circuit after a predetermined time elapses following said first measurement step; and

- a step of repeating said first measurement step and said third measurement step if the absolute value of the difference between the capacitance or oscillation frequency measured in said first measurement step and the capacitance or oscillation frequency measured in said third measurement step is greater than a predetermined value, or

repeating, if the absolute value of said difference is not greater than the predetermined value, the steps from said first measurement step after a predetermined time elapses while awaiting the detection of said container being disposed on said container supporting means.